AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1-43 canceled

44.(new) A method for producing a three-dimensional multi-material component by the ink-jet-type printing of droplets of at least one material in successive layers, wherein it comprises at least the stages consisting of:

(1) cutting up a representation of the multi-material component into characteristic objects;

(2) slicing the representation of the component into print layers as a function of said characteristic objects;

(3) establishing a plurality of discrete spatial print path trajectories for each print layer;

(4) establishing a set of printing parameters as a function of the nature of the materials deposited and the deposition conditions thereof for each print layer and for each discrete spatial trajectory;

(5) establishing a spatial and temporal sequencing law for the print path for said print layers and for said discrete spatial trajectories as a function of the objects, their relative three-dimensional arrangement and the characteristics of the printer, in order to optimise the process of depositing each print layer.

45.(new) The method according to claim 44, wherein the slicing of the representation of the multi-material composite consists in maximising the quantity of materials deposited per print layer.

46.(new) The method according to claim 44, further comprising:

determining a first modulation of discrete spatial print path trajectories for each print layer;

determining at least one predetermined direction of discrete spatial print path trajectory for each print layer;

determining a second modulation of the discrete spatial print path trajectory from a current layer to the following layer for two successive print layers of the same object, said modulation depending on the number of constituent layers to be deposited for said object in order to optimise the cohesion of the final structure of said multi-material component.

47.(new) The method according to claim 46, wherein said first modulation consists in determining a second discrete spatial trajectory by a spatial shift of the ejection step of a first discrete spatial trajectory.

48.(new) The method according to claim 46, wherein said second modulation of the discrete spatial print path trajectory is a modulation of the print path direction defined for each print layer of the object relative to an orthogonal reference frame, each print layer being allocated a specific direction which differs from a preceding print layer to the following print layer of the object.

49.(new) The method according to claim 46, wherein, for a successive ejection of at least one droplet of material at a

predetermined ejection step, said second modulation consists of an amplitude and/or spatial shift modulation of said ejection step from a preceding print layer to the following print layer of the object.

50.(new) The method according to claim 44, wherein the spatial and temporal sequencing law for print path of the print layers and the discrete spatial trajectories comprises a plurality of printing instructions and of successive cleanings of the ejection system.

51.(new) The method according to claim 44, wherein one of the printing parameters is the ejection distance orthogonal to the deposition surface, said method consisting in regulating said ejection distance around nominal values, the nominal values being determined so as to optimise the deposition of the materials on the deposition surface.

52.(new) The method according to claim 44, wherein one of the printing parameters is the size and shape of the ejected material droplets, said method consisting in controlling the size and the shape of each droplet of materials to be ejected, as a function of the nature of the materials, the deposition conditions thereof and predetermined print layer thicknesses.

53.(new) The method according to claim 44, wherein one of the printing parameters is the temperature of the materials prior to ejection, said method consisting in controlling the temperature of these materials prior to ejection of each droplet, as a function of the nature of these materials and the type of ejection means.

54.(new) The method according to claim 44, wherein one of the printing parameters is the degree of obstruction of the ejection

system, said method consisting in cleaning the ejection system once the degree of obstruction exceeds a predetermined obstruction threshold value.

55.(new) The method according to claim 44, wherein one of the printing parameters is the storage state of the materials, said method consisting in controlling the material state characteristics by controlling the temperature, controlling the pressure and controlling the state of dispersion of the stored materials as a function of their nature in order to optimise the material storage conditions.

56.(new) The method according to claim 44, wherein one of the printing parameters is the state of the printing environment, said method consisting in controlling the characteristics of the environment in which the multi-material component is produced as a function of the nature of the deposited materials.

57.(new) The method according to claim 44, wherein one of the printing parameters is the power and wavelength of a radiation applied to the deposited materials as a function of the nature of the deposited materials.

58.(new) A device for producing a multi-material component by the ink-jet-type printing of droplets of at least one material in successive layers, comprising:

- independent means (103a, 103b, 103c) for three-dimensional displacement in three reference directions;

- material droplet ejection means (110a, 110b, 111a, 111b) which are integral with the three-dimensional displacement means and are controlled in terms of temperature, pressure and size and shape of ejected droplets;

- means (106a, 106b) for storing and conditioning the materials, adapted to control the temperature, pressure and state of dispersion of the materials and connected to the ejection means (110a, 110b, 111a, 111b);

- a data processing unit (105) comprising:

  - a module (198) for computing and determining characteristic objects of a representation of said multi-material component to be produced and of successive print layers on the basis of said characteristic objects;

  - a module (201, 202) for establishing, for each print layer, a plurality of discrete spatial print path trajectories and a spatial and temporal sequencing law for said print layers and said discrete spatial trajectories;

  - a module (202) for establishing a set of printing parameters for each layer and each discrete spatial trajectory; and

  - a module (204, 207, 208, 209, 210, 211) for monitored control of said independent three-dimensional displacement means (103a, 103b, 103c), said means (106a, 106b) for storing and conditioning the materials and said material droplet ejection means (110a, 110b, 111a, 111b), in order to optimise production of the multi-material component.

- three-dimensional displacement measuring means (112, 117a, 117b) and printing parameter measuring means, connected to the data processing unit;

- means (210) for synchronising the three-dimensional displacement and ejection of materials as a function of the sequencing law.

59.(new) The device according to claim 58, wherein the module (198) for computing and determining characteristic objects of a representation of said multi-material component to be produced and successive print layers on the basis of said characteristic objects is adapted to maximise the quantity of materials deposited per print layer.

60.(new) The device according to claim 58, wherein the establishing module (201, 202) is adapted to determine, for each print layer, a first modulation of discrete spatial print path trajectories, means for determining, for each layer, at least one predetermined direction of discrete spatial print path trajectory, and means for determining, for two successive print layers of the same object, a second modulation of the discrete spatial print path trajectory from a current print layer to the following print layer of the object, said modulation depending on the number of constituent print layers to be deposited for said object.

61.(new) The device according to claim 60, wherein the establishing module (201, 202) for determining said first modulation is adapted to determine a second discrete spatial trajectory by a spatial shift of the ejection step of a first discrete spatial trajectory.

62.(new) The device according to claim 60, wherein the establishing module (201, 202) for determining said second modulation of discrete spatial print path trajectory is capable of determining a modulation of the print path direction, defined for each print layer of the object relative to an orthogonal

reference frame, each print layer being allocated a specific direction which differs from a preceding print layer to the following print layer of the object.

63.(new) The device according to claim 60, wherein the module (201, 202) for determining said second modulation is capable, for successive ejection of at least one droplet of materials by a given ejection step, of determining an amplitude and/or spatial shift modulation of said ejection step from a preceding print layer to the following layer of the object.

64.(new) The device according to claim 58, wherein the establishing module (201, 202) is adapted to establish a spatial and temporal sequencing law for print path of the print layers and of the discrete print trajectories comprising a plurality of instructions for printing and cleaning the ejection system.

65.(new) The device according to claim 58, wherein the three-dimensional displacement means (103a, 103b, 103c) are formed by three independent unidirectional displacement plates which are each displaced by a given ejection step, the first (103a) along a first horizontal axis X, the second (103b) along a second horizontal axis Y and the third (103c) along a third vertical axis Z, the axes X, Y and Z defining said orthogonal reference frame.

66.(new) The device according to claim 65, wherein the module (204, 207, 208, 209, 210, 211) for controlling the displacement system is adapted to control the first plate (103a) and the second plate (103b) according to the spatial and temporal sequencing law for print path of the print layers and the spatial trajectories.

67.(new) The device according to claim 58, wherein the ejection means (110a, 110b, 111a, 111b) are formed by at least one ejection head (110a, 110b) connected to the means (106a, 106b) for storing the materials and by at least one ejection nozzle (111a, 111b) connected to the at least one ejection head (110a, 110b).

68.(new) The device according to claim 67, wherein the ejection means (110a, 110b, 111a, 111b) comprise means (115a, 115b) for controlling the temperature and pressure of the material, which are adapted to control the temperature of the material in each of the at least one ejection heads and to control the pressure of the material in each of the at least one ejection heads.

69.(new) The device according to claim 68, wherein the control module (205, 207, 208, 209, 210, 211) comprises means (210) adapted to control the means (115a, 115b) for controlling the temperature and pressure of the materials as a function of the nature of the material and of the ejection and deposition conditions thereof.

70.(new) The device according to claim 67, wherein the control module (204, 207, 208, 209, 210, 211) comprises means (209) for controlling the shape and size of the droplets ejected by at least one ejection nozzle (111a, 111b), said control means being adapted to control the shape and size of the droplets by the at least one ejection nozzle (111a, 111b) by transmitting a control signal to the at least one ejection nozzle, said signal being representative of the size and shape of the droplet of materials to be ejected, as a function of the nature of the materials, the deposition conditions thereof and the morphology of the already printed layers.

71.(new) The device according to claim 67, wherein control module (204, 207, 208, 209, 210, 211) comprises means (208) for controlling one of the plates, adapted to control the distance between the nozzle and deposition surface on the basis of measurement of the distance between the nozzle and the deposition surface, the nature of the materials and the deposition conditions thereof.

72.(new) The device according to claim 58, wherein the means (106a, 106b) for storing and conditioning the materials comprise means (107a, 107b) for controlling the temperature, pressure and rheological property of the materials, which are adapted to control the characteristics of the stored materials by controlling the temperature, pressure and state of dispersion of the stored materials, and in that the control module (204, 207, 208, 209, 210, 211) comprises control means (211) adapted to control said means (107a, 107b) for controlling the temperature, pressure and state of dispersion as a function of the nature and deposition conditions thereof.

73.(new) The device according to claim 58, wherein the data processing unit (105) is connected to means for acquiring the degree of obstruction of the ejection means and is adapted to trigger a cleaning sequence once the degree of obstruction of the ejection means (110a, 110b, 111a, 111b) measured by the means for acquiring the degree of obstruction exceeds a predetermined obstruction threshold value.

74.(new) The device according to claim 71, wherein the means (117a, 117b) for measuring the distance between the nozzle and the deposition surface comprise at least one laser sensor.

75.(new) The device according to claim 58, wherein it comprises a production chamber (123) in which the multi-material component is

produced, the chamber being adapted to control the characteristics of the printing environment.

76.(new) The device according to claim 75, wherein the chamber (123) is adapted to control the temperature of the environment in which the component is produced.

77.(new) The device according to claim 58, wherein it comprises a radiation source (130) connected to the data unit (105) and adapted to emit radiation as a function of the nature of the deposited materials.

78.(new) The device according to claim 77, wherein the data unit (105) is adapted to control the radiation source (130) in terms of instants of emission, power, wavelength of the radiation emitted by the radiation source (130) to control a change of state of the deposited materials.

79.(new) The device according to claim 58, wherein the printing parameters are optimised as a function of the nature of the materials and characteristics of the printer, said parameters being stored in a database (199).

80.(new) A device for storing a material for a device for production by ink-jet-type printing, wherein it comprises, in the vicinity of a material outlet orifice (302): a system (307) for delivery of this material, the opening of said delivery system being controlled, stirrer means (304, 305, 309), temperature control means (311) and pressure control means (316) for the stored material, in order to optimise the state of the material in the vicinity of the outlet orifice (302) thereof.

81.(new) The device according to claim 80, wherein the temperature control means (311) are formed by at least one Peltier effect module.

82.(new) The device according to claim 80, wherein the stirrer means comprise a motor, an internal shaft of which one end is adjacent to the outlet orifice, and at least one stirrer blade fixed to the end adjacent to the outlet orifice and in that the motor sets the internal shaft into rotation via a magnetic drive system.

83.(new) An ejection head for a material for a device for production by ink-jet-type printing, wherein it comprises a material tank (500), means (507, 508, 509, 510) for controlling the temperature of the material stored in said tank, means for controlling the pressure of the material in said tank and means for cleaning the discharge pipe for said material.

84.(new) The ejection head according to claim 83, wherein the material temperature control means (507, 508, 509, 510) are formed by at least a heat-extracting ventilation system (510), a heat exchanger system (509), a cooling system (508) and a system (507) for thermal interfacing between the material contained in said tank (500) and the cooling system.

85.(new) The ejection head according to claim 83, wherein the material partially fills said tank and in that the material pressure control means are adapted to control the pressure of the gas in the free portion (512) of the tank.

86.(new) The ejection head according to claim 83, wherein the material discharge pipe cleaning means are formed by a cleaning fluid injection system (503b) at the intake (502) of said tank (500).